

CLAIMS

- 1 1. An electrically continuous conformal EMI protective shield for adhering directly to
2 and conforming with surfaces of at least a region of a printed circuit board comprising:
3 a dielectric coating adhering directly to surfaces of the printed circuit board to
4 provide an electrically nonconductive, contiguous layer over all such printed circuit board
5 surfaces; and
6 a conductive coating comprising a contiguous layer of an intrinsically conducting
7 polymer adhering directly to surfaces of the dielectric coating to provide an electrically
8 conductive layer that prevents at least a portion of electromagnetic emissions generated
9 by the printed circuit board from emanating beyond the conformal EMI protective shield.
- 1 2. The conformal EMI shield of claim 1, wherein the intrinsically conductive polymer
2 comprises one or more of the group consisting of polypyrrole, polyaniline, polyacetylene,
3 polythiophenes, poly(p-phenylene vinylene)s, poly-thylenedioxythiophene and
4 polyphenylenesulfide.
- 1 3. The conformal EMI shield of claim 1, wherein said conductive coating is formed
2 from a conductive polymeric dispersion comprising the intrinsically conducting polymer
3 suspended in a base liquid.
- 1 4. The conformal EMI shield of claim 3, wherein the base liquid is water.
- 1 5. The conformal EMI shield of claim 3, wherein said conductive polymeric dispersion
2 further comprises:
3 a plurality of substrate beads suspended in the base liquid.
- 1 6. The conformal EMI shield of claim 5, wherein the conductive polymeric dispersion
2 is a core-shell dispersion with the substrate beads coated with the intrinsically
3 conductive polymer.

- 1 7. The conformal EMI shield of claim 5, wherein the substrate beads comprise at least
2 one of the group consisting of acrylic beads and polyurethane beads.
- 1 8. The conformal EMI shield of claim 5, wherein the conductive polymeric dispersion
2 further comprises:
3 binder particles suspended in the dispersion.
- 1 9. The conformal EMI shield of claim 8, wherein the binder particles are formed of one
2 of an acrylic or urethane.
- 1 10. The conformal EMI shield of claim 8, wherein the conductive polymeric dispersion
2 further comprises:
3 one or more additives that facilitate a desired curing process.
- 1 11. The conformal EMI shield of claim 8, wherein the desired curing process is one or
2 more of either UV curing and temperature curing.
- 1 12. The conformal EMI shield of claim 1, wherein the conductive coating has a
2 conductivity between 10^{-8} to 10^6 S/cm.
- 1 13. The conformal EMI shield of claim 1, wherein the conductive coating has a
2 conductivity of between 0 to 10^6 S/cm.
- 1 14. The conformal EMI shield of claim 1, wherein the conductive coating has a redox
2 potential of greater than zero.
- 1 15. The conformal EMI shield of claim 14, wherein the redox potential is approximately
2 +0.8 volts

- 1 16. A printed circuit board (PCB) comprising:
2 a printed wiring board;
3 a plurality of components mounted on the printed wiring board; and
4 a conformal coating secured to surfaces of at least a region of the PCB, comprising
5 a conductive coating that prevents electromagnetic waves from passing
6 therethrough, and that includes an intrinsically conductive polymer (ICP) layer
7 conformingly and adheringly disposed on the PCB surfaces, and
8 a dielectric coating interposed between the conductive coating and
9 predetermined portions of the PCB surfaces so as to completely insulate the
10 predetermined PCB portions from current traveling through the ICP layer of the
11 conductive coating.
- 1 17. The printed circuit board of claim 16, wherein the conformal coating is applied to
2 regions of the printed circuit board defining regions of the conformal coating, wherein the
3 regions of the conformal coating are electrically connected to each other.
- 1 18. The printed circuit board of claim 16, wherein said printed circuit board comprises a
2 plurality of grounding pads mounted in said printed wiring board,
3 wherein the conductive coating is connected electrically to one or more of the
4 grounding pads, wherein the ground pads are electrically connected to a ground source of
5 the printed wiring board.
- 1 19. A method for coating a printed circuit board comprising:
2 providing a printed circuit board; and
3 conformingly adhering to surfaces of at least a region of the printed circuit board a
4 continuous conformal coating for providing an EMI-impervious shield comprising,
5 a dielectric coating adhering directly to surfaces of the printed circuit board to
6 provide an electrically nonconductive, contiguous layer over all such printed circuit
7 board surfaces; and
8 a conductive coating comprising a contiguous layer of an intrinsically
9 conducting polymer adhering directly to surfaces of the dielectric coating to provide
10 an electrically conductive layer that prevents at least a portion of electromagnetic

11 emissions generated by the printed circuit board from emanating beyond the
12 conformal EMI protective shield.

1 20. The method of claim 19, wherein the conductive coating is formed from a conductive
2 polymeric dispersion comprising:
3 a base liquid;
4 a plurality of substrate beads suspended in the base liquid and coated with the
5 intrinsically conducting polymer; and
6 binder particles suspended in the dispersion,
7 wherein, when cured, the substrate beads are secured to the surface of the dielectric
8 coating by solidified binder particles.

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